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**PATENT
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Appl. No. : 10/712,829

Appellants: LAMBERT et al.

Filed : November 12, 2003

Title : PROCESS FOR REMOVAL OF CATALYST RESIDUES FROM POLY-
ALPHA-OLEFINS

TC/A.U. : 1764

Examiner : Boyer, R.

Docket No.: 0204-PA (UNII76US)

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Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPELLANTS' APPEAL BRIEF

Sir:

The above-identified Appellants submit this Appellants' Appeal Brief pursuant to 37 C.F.R. § 41.37. The Notice of Appeal was filed on June 6, 2007.

Please charge the official fee of \$500 for filing a brief in support of an appeal to our Deposit Account Number 23-2656. A duplicate copy of this page is enclosed.

The Appellants rely upon the following authorities and arguments to maintain the appeal.

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1. Real Party in Interest

The real party in interest for this matter is the Appellants' assignee. The assignee and real party in interest are Chemtura Corporation, formerly known as Crompton Corporation, Benson Road, Middlebury, Connecticut 06749.

2. Related Appeals and Interferences

There are no other appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

3. Status of Claims

The status of the claims is as follows:

Claims 1 through 20 are pending in the application and are rejected and appealed.

The procedural history behind this status of the claims is as follows:

Application No. 10/712,829 was filed on November 12, 2003. Claims 1 through 10 were originally filed.

In an Office Action of November 21, 2006, claims 1 through 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wettling et al. (US 2003/0162918) in view of Ishikawa et al. (U.S. Patent No. 3,567,795).

In a Response of January 29, 2007, Appellants added new claims 11 through 20.

In an Office Action of March 21, 2007, the Examiner made final the rejection of claims 1 through 20 under 35 U.S.C. § 103(a), as being unpatentable over Wettling et al. (US 2003/0162918) in view of Ishikawa et al. (U.S. Patent No. 3,567,795).

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In a Response of April 30, 2007, the Appellants maintained claims 1 through 20.

In an Advisory Action of May 22, 2007, the Examiner stated that the Appellants' request for reconsideration had been considered but did not place the application in condition for allowance.

Appellants filed a Notice of Appeal on June 6, 2007.

4. Status of Amendments

No amendments were filed subsequent to the final rejection by the Examiner. Therefore, the attached listing of claims reflects the claims proposed at the time of the final Office Action of May 22, 2007.

5. Summary of Claimed Subject Matter

The present invention, as described in the specification at page 10, lines 2 through 12, and page 13, lines 3 through 7, is drawn to a method for reducing levels of residual halogen and Group IIIb metals in a crude poly(α -olefin) polymerized in the presence of a catalyst comprising the halogen and Group IIIb metals. The method comprises (A) washing the crude poly(α -olefin) with water; (B) separating the aqueous and organic phases; (C) then adding an adsorbent selected from the group consisting of magnesium silicates, calcium silicates, aluminum silicates, aluminum oxides, and clays to the organic phase to form a slurry; (D) heating the slurry under reduced pressure at a temperature of at least about 180°C for at least about thirty minutes; and then (E) separating the adsorbent from the slurry. (See specification page 10, lines 2 through 12, page 13, lines 3 through 7, and claim 1.)

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In a second embodiment, as described in the specification at page 11, line 20, through page 13, line 2, and page 13, lines 14 through 20, the present invention is drawn to a method for reducing levels of residual bromine and aluminum in a crude poly(α -olefin) polymerized in the presence of a catalyst comprising the bromine and aluminum. The method comprises (A) washing the crude poly(α -olefin) with water; (B) separating the aqueous and organic phases; (C) then adding about 0.4 eq. Mg/eq. halogen of a magnesium silicate to the organic phase to form a slurry; (D) heating the slurry under reduced pressure at a temperature of at least about 180°C for at least about 90 minutes; and then (E) filtering the magnesium silicate from the slurry. (*See* specification at page 11, line 20, through page 13, line 2, page 13, lines 14 through 20, and claim 10.)

In a third embodiment, as described in the specification at page 10, lines 2 through 12, page 11, line 20 through page 12, line 3, and page 13, lines 3 through 7, the present invention is drawn to a method for reducing levels of residual halogen and Group IIIb metals in a crude poly(α -olefin) polymerized in the presence of a catalyst comprising the halogen and Group IIIb metals. The method comprises (A) washing the crude poly(α -olefin) with water; (B) separating the aqueous and organic phases; (C) then adding an adsorbent selected from the group consisting of magnesium silicates, calcium silicates, and aluminum silicates to the organic phase to form a slurry; (D) heating the slurry under reduced pressure at a temperature of at least about 180°C for at least about 30 minutes; and then (E) separating the adsorbent from the slurry. (*See* specification page 10, lines 2 through 12, page 11, line 20 through page 12, line 3, page 13, lines 3 through 7, and claim 11.)

6. Grounds of Rejection to Be Reviewed on Appeal

Are claims 1 through 20 unpatentable under 35 U.S.C. § 103(a) as being obvious over Wettling et al. (U.S. 2003/0162918) in view of Ishikawa et al. (U.S. Patent No. 3,567,795)?

7. Argument

The Background of the Invention

The claimed invention relates a method for separating contaminants from olefin polymers. More particularly, the present invention relates to a method for removing residual catalyst components from an olefin polymerization product obtained in the presence of the catalyst. (See specification page 1, lines 4 through 7.)

The Pending Rejections

Are claims 1 through 20 unpatentable under 35 U.S.C. § 103(a) as being obvious over Wettling et al. (U.S. 2003/0162918) in view of Ishikawa et al. (U.S. Patent No. 3,567,795)?

Claims 1 through 20 have been rejected under 35 U.S.C. 103(a) as being obvious over Wettling et al. (U.S. 2003/0162918) in view of Ishikawa et al. (U.S. Patent No. 3,567,795).

Wettling et al. disclose a process for the preparation of polyisobutylenes by cationic polymerization of isobutylene or isobutylene-containing hydrocarbon streams in the liquid phase in the presence of boron trifluoride acting as catalyst, the catalytic activity of boron trifluoride being partially or completely stopped by means of a solid deactivator following a given time-lapse, which deactivator is an inorganic, anhydrous or hydrous oxygen compound of aluminum which is insoluble in the reaction mixture.

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With respect to claim 1, Wettling discloses a process for catalyst deactivation of a crude polyolefin polymerized in the presence of a boron trifluoride catalyst whereby the crude polyolefin is washed with water (see Wettling, page 4, paragraph 62), the aqueous and organic phases are separated (see Wettling, page 4, paragraph 62), an aluminum oxide adsorbent (deactivator) is added to the organic phase to form a slurry (see Wettling, page 4, paragraph 54), the slurry is heated (see Wettling, page 5, paragraph 75), and the adsorbent is separated from the organic phase (see Wettling, page 5, paragraph 75).

(Office Action of November 21, 2006, Examiner's remarks.)

With regard to the Examiner's statement that it is disclosed on page 5, paragraph 75 that the slurry is heated, it is submitted that this statement, while being strictly true, is inapposite for showing the process of the present invention to be obvious. The language referred to reads:

The deactivator was placed in a sealable, pressure-resistant sampling glass. A sample of 50 mL was added at -15°C with vigorous mixing within a few seconds and stirring was continued at this temperature over a period of 30 minutes. The mixture was heated to +20°C in the sealed sampling glass during the following 60 minutes with stirring by a magnetic agitator.

The claims of the present application require the step of heating the slurry under *reduced* pressure at a temperature of at least about 180°C for at least about 30 minutes. It is submitted that letting a mixture stand at -15°C for 30 minutes and then heating to +20°C over a 60 minute period in a sealed tube would not suggest to the person of ordinary skill in the art the required step of the present invention. Not only is the highest disclosed temperature 160 degrees below the minimum required temperature of the present invention, but heating in a *sealed* sampling glass would bring about *increased*, not reduced, pressure. Thus, step D of the currently claimed invention is not disclosed or suggested by Wettling et al. Indeed, the

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Examiner has acknowledged, "Wettling does not disclose a process step for heating the slurry solution under reduced pressure."

Wettling et al. disclose only oxides of aluminum, water, alcohols, amines, caustic soda solutions, and aqueous ammonia as deactivators and makes no mention of the water-insoluble silicates, i.e., magnesium silicate, calcium silicate, and aluminum silicate, required by claims 10 through 20 of the present application.

Ishikawa et al. disclose a process of refining hydrocarbon polymers obtained by liquid-phase polymerization with a Friedel-Crafts catalyst, wherein the polymer solution, containing catalyst, is contacted with an aqueous solution of a water-soluble salt selected from the group consisting of nitrates, sulfates, thiosulfates, phosphates, oxalates and silicates, reportedly making it possible to eliminate the catalyst as a decomposition product.

In an effort to overcome the deficiencies of Wettling et al., the Examiner has cited Ishikawa et al., saying that in column 5, at lines 16-18, it is disclosed that sodium silicate is brought into contact with a crude polymer solution and heated under conditions of reduced pressure.

First, the use of sodium silicate is outside the scope of the present claimed invention. As required by Ishikawa et al., a *water soluble* salt, e.g., sodium silicate, must be used (see column 2, lines 29-32). The silicates claimed for use in the present invention are calcium silicate, magnesium silicate, and aluminum silicate, *none of which are water-soluble*. Those skilled in the art know that the only water-soluble silicates are those of alkali metals. Thus, Ishikawa et al. fail to disclose or suggest the adsorbents of the present invention.

Second, with regard to step D of the present invention, the heating step, the Ishikawa et al. temperature only goes up to 100°C, rather than the minimum required 180°C of the present invention.

Third, step E, the separation step, of the present invention takes place *after the step of heating* the slurry under reduced pressure, i.e., step D. Ishikawa et al., to the contrary, carry out their heating step *after the step of separating the clay adsorbent*.

Thus, Ishikawa et al. do not teach:

- (1) the use of the adsorbents of the present invention;
- (2) the heating step of the present invention, i.e., at least 180°C; or
- (3) the step of separating the adsorbent after a heating step.

The references cited by the Examiner fail to establish obviousness of the claimed invention. The cited references do not teach, and in fact teach away from the claimed invention.

Conclusion

The Appellants maintain that this file should be remanded to the Examiner for further prosecution or the rejections should be reversed, and favorable consideration of the application is respectfully requested.

8. Claims Appendix

An appendix is attached that contains a copy of the claims, as amended, that are involved in this appeal.

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9. **Evidence Appendix**

The Appellants do not rely on additional evidence in this appeal.

10. **Related Proceedings Appendix**

The Appellants are unaware of any related proceedings.

Respectfully submitted,

24 July 2007

Date



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Claims Appendix

Listing of Claims:

1. (Original) A method for reducing levels of residual halogen and Group IIIb metals in a crude poly(α -olefin) polymerized in the presence of a catalyst comprising the halogen and Group IIIb metals, wherein the method comprises:
 - A) washing the crude poly(α -olefin) with water;
 - B) separating the aqueous and organic phases;
 - C) then adding an adsorbent selected from the group consisting of magnesium silicates, calcium silicates, aluminum silicates, aluminum oxides, and clays to the organic phase to form a slurry;
 - D) heating the slurry under reduced pressure at a temperature of at least about 180° C for at least about thirty minutes; and then
 - E) separating the adsorbent from the slurry.
2. (Original) The method of claim 1 wherein the halogen is selected from the group consisting of chlorine, bromine, and mixtures thereof.
3. (Original) The method of claim 2 wherein the halogen is bromine.
4. (Original) The method of claim 1 wherein the Group IIIb metal is aluminum

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5. (Original) The method of claim 1 wherein the adsorbent is a magnesium silicate.
6. (Original) The method of claim 1 wherein the heating step is continued for at least about 90 minutes.
7. (Original) The method of claim 1 wherein the heating step is continued for at least about 180 minutes.
8. (Original) The method of claim 1 wherein the adsorbent is employed at a level of at least about 0.4 eq. metal/ eq. halogen.
9. (Original) The method of claim 1 wherein the adsorbent is separated from the slurry by filtration.
10. (Original) A method for reducing levels of residual bromine and aluminum in a crude poly(α -olefin) polymerized in the presence of a catalyst comprising the bromine and aluminum, wherein the method comprises:
 - A) washing the crude poly(α -olefin) with water;
 - B) separating the aqueous and organic phases;
 - C) then adding about 0.4 eq. Mg/ eq. halogen of a magnesium silicate to the organic phase to form a slurry;

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D) heating the slurry under reduced pressure at a temperature of at least about 180° C for at least about ninety minutes; and then

E) filtering the magnesium silicate from the slurry.

11. (Previously Presented) A method for reducing levels of residual halogen and Group IIIb metals in a crude poly(α -olefin) polymerized in the presence of a catalyst comprising the halogen and Group IIIb metals, wherein the method comprises:

A) washing the crude poly(α -olefin) with water;

B) separating the aqueous and organic phases;

C) then adding an adsorbent selected from the group consisting of magnesium silicates, calcium silicates, and aluminum silicates to the organic phase to form a slurry;

D) heating the slurry under reduced pressure at a temperature of at least about 180° C for at least about thirty minutes; and then

E) separating the adsorbent from the slurry.

12. (Previously Presented) The method of claim 11 wherein the halogen is selected from the group consisting of chlorine, bromine, and mixtures thereof.

13. (Previously Presented) The method of claim 12 wherein the halogen is bromine.

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14. (Previously Presented) The method of claim 11 wherein the Group IIIb metal is aluminum
15. (Previously Presented) The method of claim 11 wherein the adsorbent is a magnesium silicate.
16. (Previously Presented) The method of claim 11 wherein the heating step is continued for at least about 90 minutes.
17. (Previously Presented) The method of claim 11 wherein the heating step is continued for at least about 180 minutes.
18. (Previously Presented) The method of claim 11 wherein the adsorbent is employed at a level of at least about 0.4 eq. metal/ eq. halogen.
19. (Previously Presented) The method of claim 11 wherein the adsorbent is separated from the slurry by filtration.
20. (Previously Presented) The method of claim 14 wherein the adsorbent is a magnesium silicate.

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Evidence Appendix

The Appellants do not submit any further evidence pursuant to 37 C.F.R. §§ 1.130, 1.31, or 1.132.

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Related Proceedings Appendix

No decisions rendered by a court or the Board in any proceeding identified pursuant to 37 C.F.R. § 41.38(c)(1)(ii) are known to the Appellants.